

## CLAIMS

We claim:

- 1 1. A substantially purified acetolactate synthase (ALS) enzyme that confers, in a plant,  
2 cross-resistance to multiple herbicides.
- 1 2. The ALS enzyme of claim 1, wherein the sequence of said ALS enzyme is SEQ ID NO: 1,  
2 or a fragment thereof with ALS activity.
- 1 3. The ALS enzyme of claim 1, wherein at least two of said multiple herbicides are selected  
2 from the group consisting of sulfonylurea, imidazolinone, pyrimidinyloxybenzoate,  
3 triazolopyrimidine and sulfonylamino-carbonyl-triazolinone herbicides.
- 1 4. A substantially purified ALS gene encoding an ALS enzyme that confers, in a plant, cross-  
2 resistance to multiple herbicides.
- 1 5. The ALS gene of claim 4, wherein said gene is SEQ ID NO: 2 or a fragment thereof  
2 encoding a polypeptide with ALS activity.
- 1 6. The ALS gene of claim 4, wherein at least two of said multiple herbicides are selected  
2 from the group consisting of sulfonylurea, imidazolinone, pyrimidinyloxybenzoate,  
3 triazolopyrimidine and sulfonylamino-carbonyl-triazolinone herbicides.
- 1 7. A method of conferring cross-resistance to multiple herbicides to a plant, comprising the  
2 step of introducing into said plant an expressible gene encoding an ALS enzyme that  
3 exhibits cross-resistance to multiple herbicides, wherein said step of introducing confers  
4 cross-resistance to multiple herbicides to said plant.
- 1 8. The method of claim 7, wherein said gene is SEQ ID NO: 1, or a fragment thereof that  
2 encodes a polypeptide having ALS activity.

- 1 9. A transgenic plant that is cross-resistant to multiple herbicides, comprised of a host plant  
2 that contains an expressible gene that is not naturally present in said plant, said gene  
3 encoding an ALS enzyme that confers cross-resistance to multiple herbicides.
- 1 10. The plant of claim 9, wherein said gene is SEQ ID NO:2, or a fragment thereof that  
2 encodes a polypeptide having ALS activity.
- 1 11. The transgenic plant of claim 9, wherein at least two of said multiple herbicides are  
2 selected from the group consisting of sulfonylurea, imidazolinone, pyrimidinyloxybenzoate,  
3 triazolopyrimidine and sulfonylamino-carbonyl-triazolinone herbicides.
- 1 12. The transgenic plant of claim 9 wherein said plant is selected from the group consisting  
2 of *Arabidopsis*, corn, cotton, soybean, rice, wheat, and forage crops.
- 1 13. The transgenic plant of claim 9, wherein said ALS enzyme has an aspartic acid to  
2 glutamic acid substitution at position six of a conserved sequence GVRFDDRVTGK (SEQ  
3 ID NO: 6).